In the Drawings

There are no amendments to the drawings.

Remarks

Applicant has amended Claims 1, 38, 53 and 64. Applicant respectfully submits that no new matter was added by the amendment, as all of the amended matter was either previously illustrated or described in the drawings, written specification and/or claims of the present application. Entry of the amendment and favorable consideration thereof is earnestly requested.

The Examiner has rejected Claims 1 – 8, 14 – 17, 26, 29 – 30, 53 - 56 and 61 under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 3,462,318 to Bjornson ("the '318 patent"). The Examiner has further rejected Claims 1 – 8, 14 – 17, 26, 29 – 30, 53 – 56 and 61 under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 3,970,481 to Stroik ("the '481 patent"). The Examiner has still further rejected Claims 1 – 8, 29, 31 – 35, 53 – 56 and 61 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 3,049,577 to Hill ("the '577 patent") in view of U.S. Patent No. 3,137,766 to Teague ("the '766 patent") and further in view of U.S. Patent No. 4,018,624 to Rizzolo ("the '624 patent"). The Examiner has also rejected Claims 22 – 26, 29, 32 – 34 and 58 under 35 U.S.C. §103(a) as being unpatentable over the '318 patent in view of U.S. Patent No. 4,989,992 to Piai ("the '992 patent"). The Examiner has further rejected Claims 18 – 21 and 57 under 35 U.S.C. §103(a) as being unpatentable over the '318 patent in view of U.S. Patent No. 3,270,547 to MacRitchie et al. ("the '547 patent"). The Examiner has still further rejected Claims 32 – 35 and 37 under 35 U.S.C. §103(a) as being unpatentable over the '318 patent in view of U.S. Patent No. 6,302,578 to Stevenson et

al. ("the '578 patent"). The Examiner has also rejected Claims 27 – 28, 36 and 62 – 63 under 35 U.S.C. §103(a) as being unpatentable over the '318 patent in view of U.S. Patent No. 3,767,470 to Hines ("the '470 patent"). These rejections are respectfully traversed.

35 U.S.C. §102(b) Rejections

As amended all claims require among other limitations, a first electrically conductive component formed of at least an oxide selected from the group consisting of yttrium oxide, cerium oxide, zirconium oxide, and combinations of these. This limitation is not disclosed in either the '318 patent or the '481 patent.

The '318 patent discloses that the "thermocouple conductors can be formed from any conventional thermocouple materials such as Chromel-Alumel, tungsten-rhenium, iridium-rhenium, platinum-rhodium, and the like." (Col. 2, lines 41 – 44). In addition, "lengths 7 and 8 of the thermocouple conductors . . . are coated with a plasma-sprayed coating 9 consisting essentially of zirconia." (Col. 2, lines 20 – 24; FIG. 1). The Examiner has submitted that this zirconia sheath comprises the first component. (Official Action, p. 2). Applicant has amended Claims 1, 38, 53 and 64 to further clarify the invention to include an electrically conductive component form of at least an oxide. Therefore, the electrically conductive components, namely lengths 7 and 8 of the thermocouple conductors are not formed of an oxide, but rather a "plasma sprayed coating 9 completely surrounds the lengths 7 and 8 and junction 3 thereby forming a

complete protection of these elements." (Col. 2, lines 28 – 29). Accordingly, because the '318 patent fails to disclose at least a first electrically conductive component formed of at least an oxide selected from the group consisting of yttrium oxide, cerium oxide, zirconium oxide, and combinations of these, as required by all the claims, the '318 patent cannot anticipate the pending claims.

The '481 patent also discloses that "metal wires 11 and 12 can be of any of the metals now commonly employed for thermocouples . . . one of the wires can be of platinum and the other can be of platinum with a 13 percent alloy of rhodium." (Col. 2, lines 51 – 55). The '481 patent further discloses that an "insulation can be composed of any desired material . . . Suitable materials for this purpose include silicon oxide . . . magnesium oxide, zirconium oxide and aluminum oxide, or mixtures thereof." (Col. 3, lines 11 – 20). Again, the '481 patent fails to disclose that the electrically conductive components, namely wires 11 and 12 are formed of an oxide as required by all the pending claims. Accordingly, because the '481 patent fails to disclose at least a first electrically conductive component formed of at least an oxide selected from the group consisting of yttrium oxide, cerium oxide, zirconium oxide, and combinations of these, as required by all the claims, the '481 patent cannot anticipate the pending claims.

35 U.S.C. §103(a) Rejections

As amended all claims require among other limitations, a first electrically conductive component formed of at least an oxide selected from the group consisting of

yttrium oxide, cerium oxide, zirconium oxide, and combinations of these; and a second electrically conductive component formed from at least at least an oxide selected from the group consisting of yttrium oxide, cerium oxide, zirconium oxide, and combinations of these. Applicant respectfully submits that neither the '577 patent nor the '766 patent teach or suggest these limitations.

The '766 patent teaches that "electric wire of the platinum family can be greatly beneficiated by flame spraying it with a coating of refractory oxide, especially by coating it with zirconia or alumina or a combination of the two." (Col. 1, lines 54 – 57). Again, the conductive electric wire is sheathed or coated in an oxide, however, the electrically conductive component is not formed of an oxide, rather it is formed by a platinum group metal and surrounded by an insulator comprising aluminum oxide and/or zirconium oxide. (Col. 3, lines 50 – 66). Likewise, the '577 patent also fails to teach that an electrically conductive component is formed of an oxide.

Likewise, the '624 patent teaches a thermocouple having two components joined together comprising a wire sheath and a mineral insulation between the wire and the sheath that is zirconium oxide. (abstract).

These patents previously discussed above, the '318 patent; the '481 patent; the '766 patent; the '577 patent; and the '624 patent; all fall into the category of thermocouple devices that "have utilized sheathing and insulation in an effort to prevent the disintegration of the thermocouple" as previously described in the background of the

invention of the present application. (para. 5). However, these types of systems also present severe disadvantages from the presently claimed invention, namely, the "insulation and sheathing system have the further disadvantage of resulting in time delays in obtaining temperature readings due to the insulation and mechanical packaging designed [and] implemented to prevent failure resulting from such problems as gas leakage at the thermocouple sheath seals, cracked sheaths and other mechanical limitations imposed by ceramic insulated metal sheathed thermocouple sensors" (para. 5) Still further, the "prior art attempts to extend the operation range of thermocouples have been limited to extending the range of known thermocouple material through the use of insulation and sheathing techniques" however, the "disadvantages of these techniques, including not reaching a high enough operating temperature, are discussed above." (para. 9). The utilization of for example, a spray type coating, tends to adversely affect the response time for the case of an open juncture device. One major problem that may be encountered with the utilization of a spray type coating is that the coating binds to the base material components at the temperatures required for the operation, leading to the embrittlement and loss of accuracy after prolonged exposure at high temperatures. Therefore, while it has been known to encase or provide a protective sheath of an oxide around the electrically conductive member, these systems do not provide an acceptable measurement system.

Accordingly, because none of the '318 patent, the '481 patent, the '766 patent or the '577 patent teaches, discloses or suggests a first <u>electrically conductive</u> component

formed of at least an oxide selected from the group consisting of yttrium oxide, cerium oxide, zirconium oxide, and combinations of these; and a second electrically conductive component formed from at least at least an oxide selected from the group consisting of yttrium oxide, cerium oxide, zirconium oxide, and combinations of these as required by Claims 1, 38, 53 and 64, no combination of these references can render the pending claims obvious.

Applicant further respectfully submits that the '992 patent also fails to teach, disclose or suggest a first electrically conductive component formed of at least an oxide selected from the group consisting of yttrium oxide, cerium oxide, zirconium oxide, and combinations of these; and a second electrically conductive component formed from at least at least an oxide selected from the group consisting of yttrium oxide, cerium oxide, zirconium oxide, and combinations of these. Rather, like the previous cited art, the '992 patent teaches that electrically conductive components "wires 11, 12" are encased in "covering 16" that has "high chemical and mechanical resistance" and that "this ceramic material must provide a solid anchorage for the wires covered by it." (Col. 4, lines 18, 46 – 50). Again, the electrically conductive component is not formed by an oxide, rather, it is sheathed in an insulating oxide, which presents all the problems previously discussed in connection with the prior art.

Applicant further notes that the Examiner has not cited either the '547 patent or the '470 patent as teaching, disclosing or suggesting an electrically conductive component formed of at least an oxide.

Likewise, the '578 patent teaches that it "is generally preferred to mount the thermocouple sensor at the end of a protective sheath 28" and that as "used herein, the terms "sheath" and "protective sheath" are used interchangeably to describe a body that provides support, protection, and electrical insulation for at least one of the thermocouple wires." (Col. 3, line 66 – Col. 4, line 2; Col. 6, lines 48 – 49). Accordingly, the electrically conductive components are not formed by an oxide, but rather they are encased in an oxide.

The '610 patent teaches that the "thermocouple element 12 is disposed coaxially within a cylindrical protective sheath 16" and that the "sheath 16 is made of a material resistant to high temperatures, such as Nimonic 80 or Hastelloy X." (Col. 4, lines 3 – 4). Nowhere however, does the '610 patent teach, disclose or suggest that an electrically conductive components is formed by an oxide as required by all pending claims.

The Examiner has submitted that the '997 patent teaches a "material Pt/Rh alloy or an alloy comprising platinum and base metal content wherein a shaped body of platinum material dispersion hardened by finely divided small particle of a base metal oxide wherein the base metal oxide is yttrium" and that it would be obvious to combine the '997 patent with the '318 patent to obtain a thermocouple capable to sustain high temperatures. (Official Action, p. 10). Applicant respectfully disagrees. First, the '318 patent fails to teach, disclose or suggest providing an electrically conductive component formed by an oxide as required by all pending claims. Second, the '997 patent is directed to "manufacturing a welded shaped body of platinum material dispersion-

hardened by finely divided small particles of base metal oxide." (abstract). The one example given in the specification describes a "sheet (dimensions: 400 mm long, 350 mm wide, 3 mm thick) of unoxidized platinum material doped with 0.18 wt % zirconium and 0.017 wt % yttrium" and that "[e]longation is accomplished with a drawing mandrel. The tube blank is formed to a wall thickness of 0.7 mm and a length of 1500 mm." (Col. 4, lines 52 – 65). However, this method again was disclosed in the background of the invention where it stated that dispersion hardening "of platinum has been developed and applied to for instance, the glass industry. For instance, zirconia grain stabilized platinum has been used in the glass industry for the construction of a sheet of material." (para. 14) However, the limitation of this technique is that "the various DPH of platinum approaches taken have utilized a powder material [finely divided small particles] that cannot be utilized and manufactured into a wire for use in a measurement device." (para. 14) Rather, this sheets of material generated by the method taught in the '997 patent are not usable in the measurement field as signal repeatability is not even addressed by this process, and a malleable electrically conductive wire cannot be made accordingly to this process.

Applicant further notes that it is well settled that the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990). It is also well settled that if the proposed modification would render the prior art invention being modified unsatisfactory for its

intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). In the present case, Applicant respectfully submits that in this case there is no suggestion in either the '318 patent or the '997 patent to combine these references as suggested. Further, combination of these references as suggested by the Examiner would result in a sensing device that would not be useable as a temperature sensor because the method taught in the '997 patent cannot be fashioned into a wire conductor and there is no signal repeatability with the method taught in the '997 patent, again rendering the sensor useless.

Accordingly, because neither the '318 patent nor the '997 patent teach, disclose or suggest a first electrically conductive component formed of at least an oxide selected from the group consisting of yttrium oxide, cerium oxide, zirconium oxide, and combinations of these; and a second electrically conductive component formed from at least at least an oxide selected from the group consisting of yttrium oxide, cerium oxide, zirconium oxide, and combinations of these as required by all the pending claims, no combination thereof can render the pending claims obvious.

The '204 patent also teaches a "[m]ethod of applying a protective layer to a component made of an oxide dispersion hardened superalloy in which the surface of the component is subjected to heat treatment and/or provided with a coating before the protective layer is applied." (abstract). The method is similar to that previously described where "[t]he manufacture of components from an oxide dispersion superalloy

begins with the production of the powder which forms the alloy" and that the "metals or metal compounds which are required for manufacturing the powder are mechanically alloyed in a high-energy pulverizer." (Col. 1, lines 18 – 23). The '204 patent further teaches that "[r]otor blades and guide blades and heat-localization segments are examples of components produced from these alloys." (Col. 1, lines 12 – 17). This is the same techniques described in the background of the invention as discussed in connection with the '997 patent. As previously stated, sheets of material generated by the method taught in the '204 patent are not usable in the measurement field as signal repeatability is not addressed by this process, and a malleable electrically conductive wire cannot be made accordingly to this process.

Accordingly, because neither the '318 patent nor the '204 patent teach, disclose or suggest a first electrically conductive component formed of at least an oxide selected from the group consisting of yttrium oxide, cerium oxide, zirconium oxide, and combinations of these; and a second electrically conductive component formed from at least at least an oxide selected from the group consisting of yttrium oxide, cerium oxide, zirconium oxide, and combinations of these as required by all the pending claims, no combination thereof can render the pending claims obvious.

It is respectfully submitted that claims 1 – 81, all of the claims remaining in the application, are in order for allowance and early notice to that effect is respectfully requested.

Respectfully submitted,

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